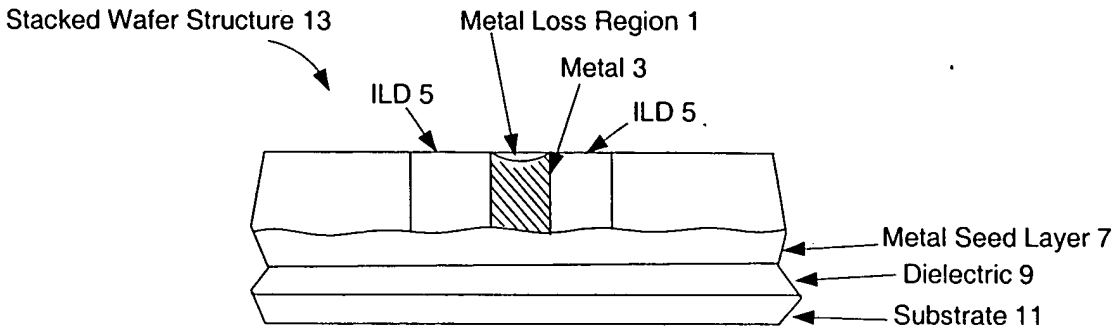

FIGURE 1A PRIOR ART

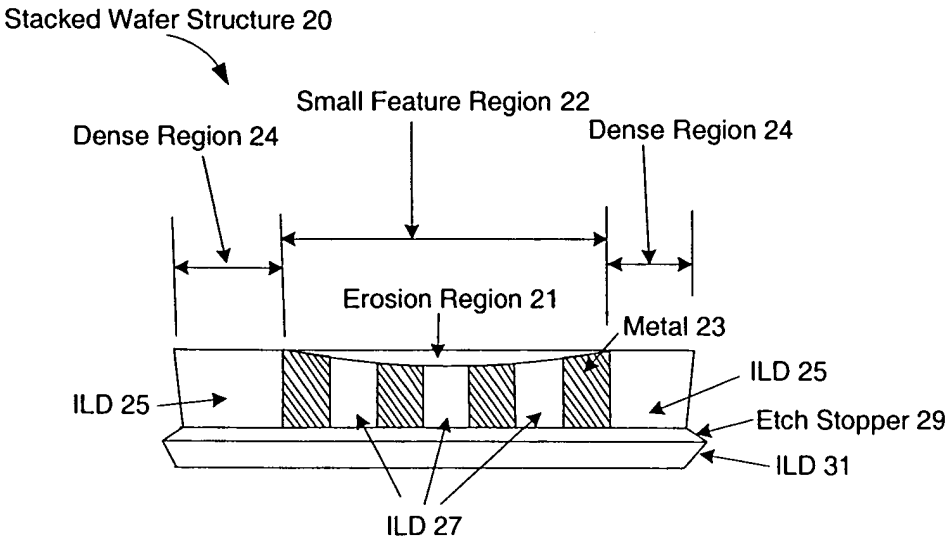

FIGURE 1B PRIOR ART

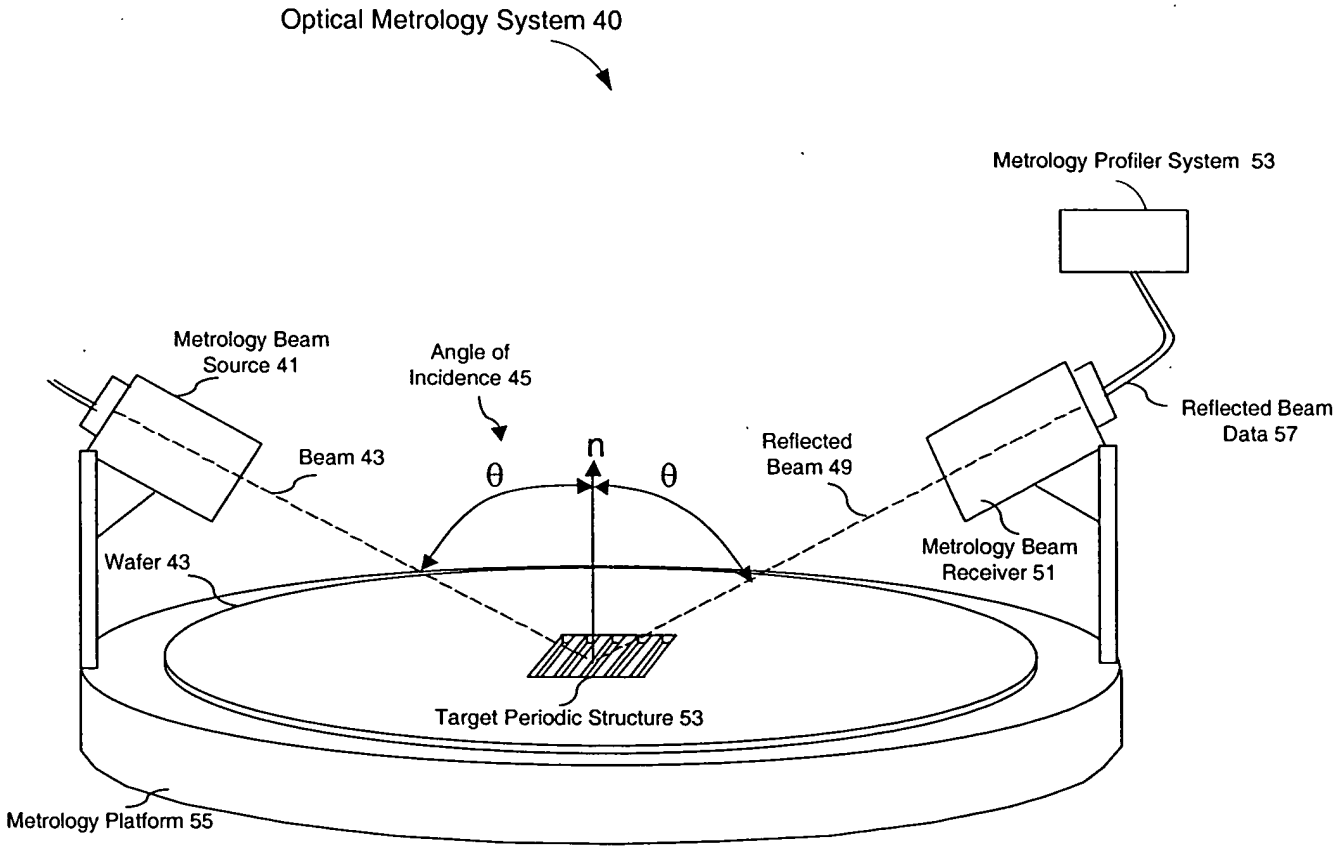
Optical Metrology System 40
Metrology Profiler System 53
Metrology Beam Source 41
Angle of Incidence 45
Reflected Beam Data 57
Beam 43
n
θ
θ
Reflected Beam 49
Wafer 43
Metrology Beam Receiver 51
Target Periodic Structure 53
Metrology Platform 55

FIGURE 2

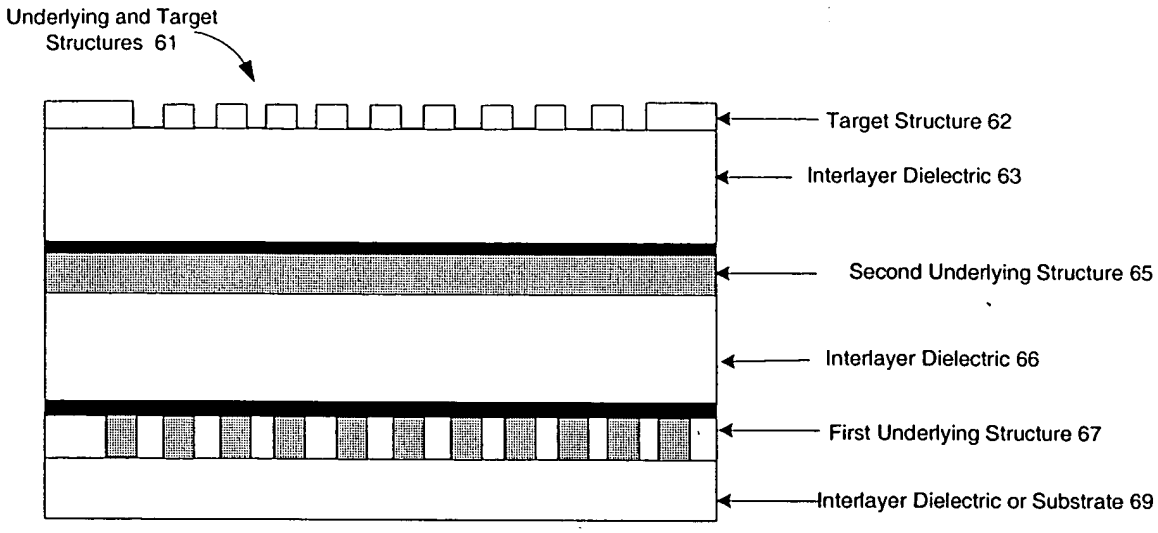

FIGURE 3A

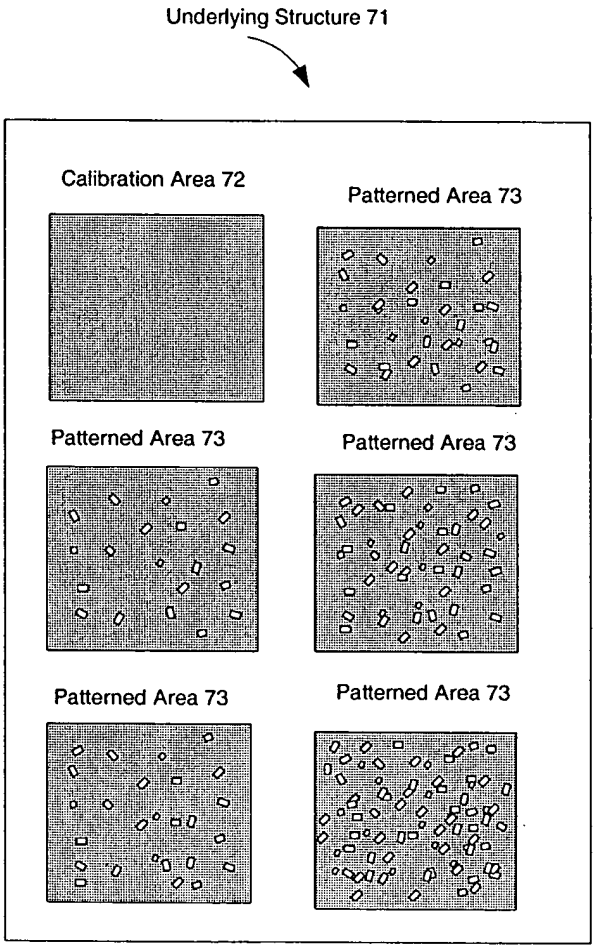

FIGURE 3B

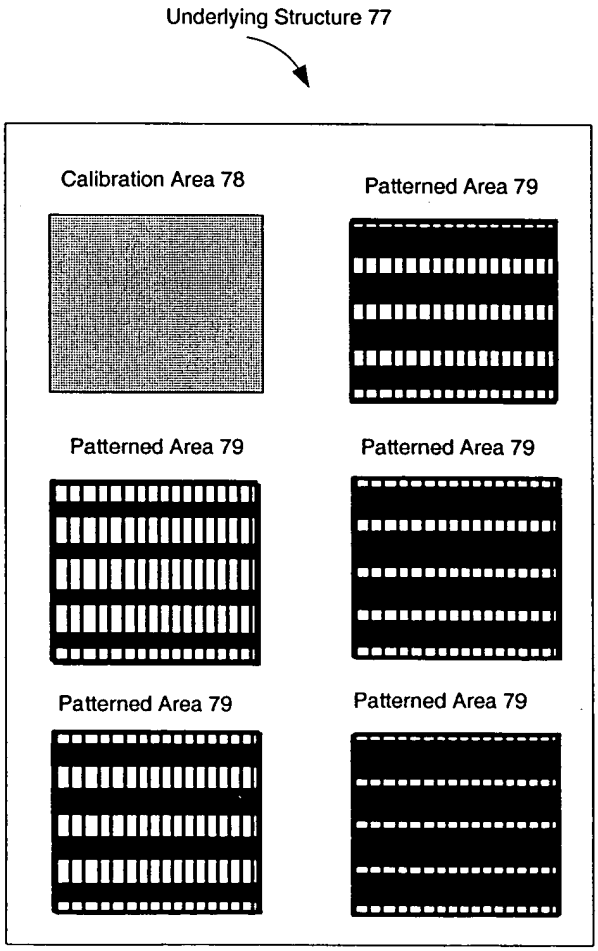

FIGURE 3C

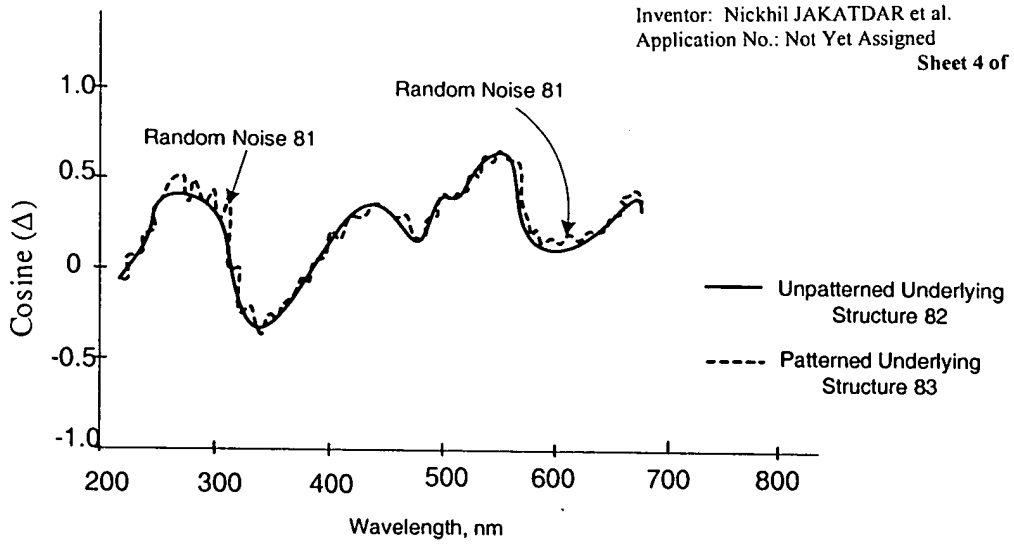

FIGURE 4A

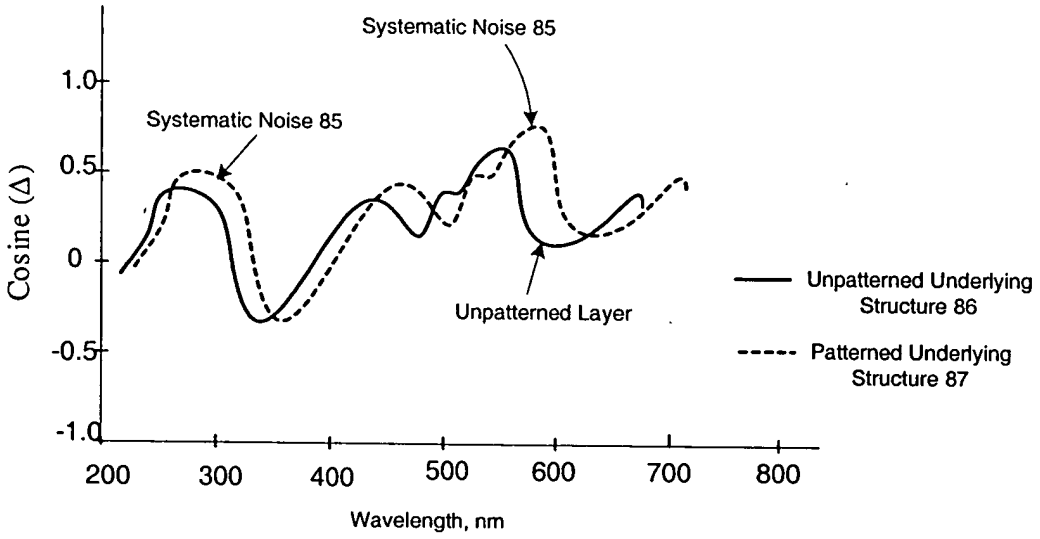

FIGURE 4B

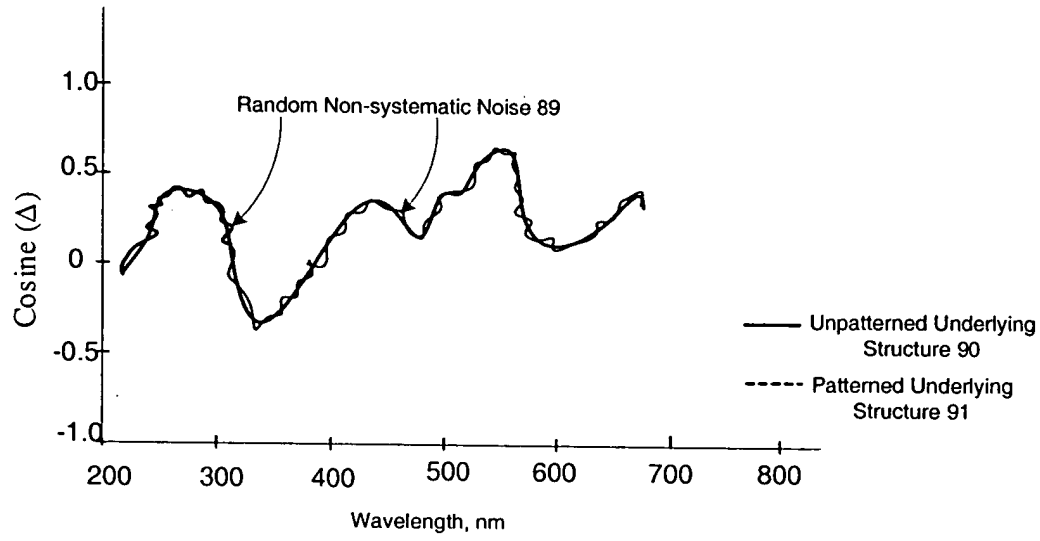

FIGURE 4C

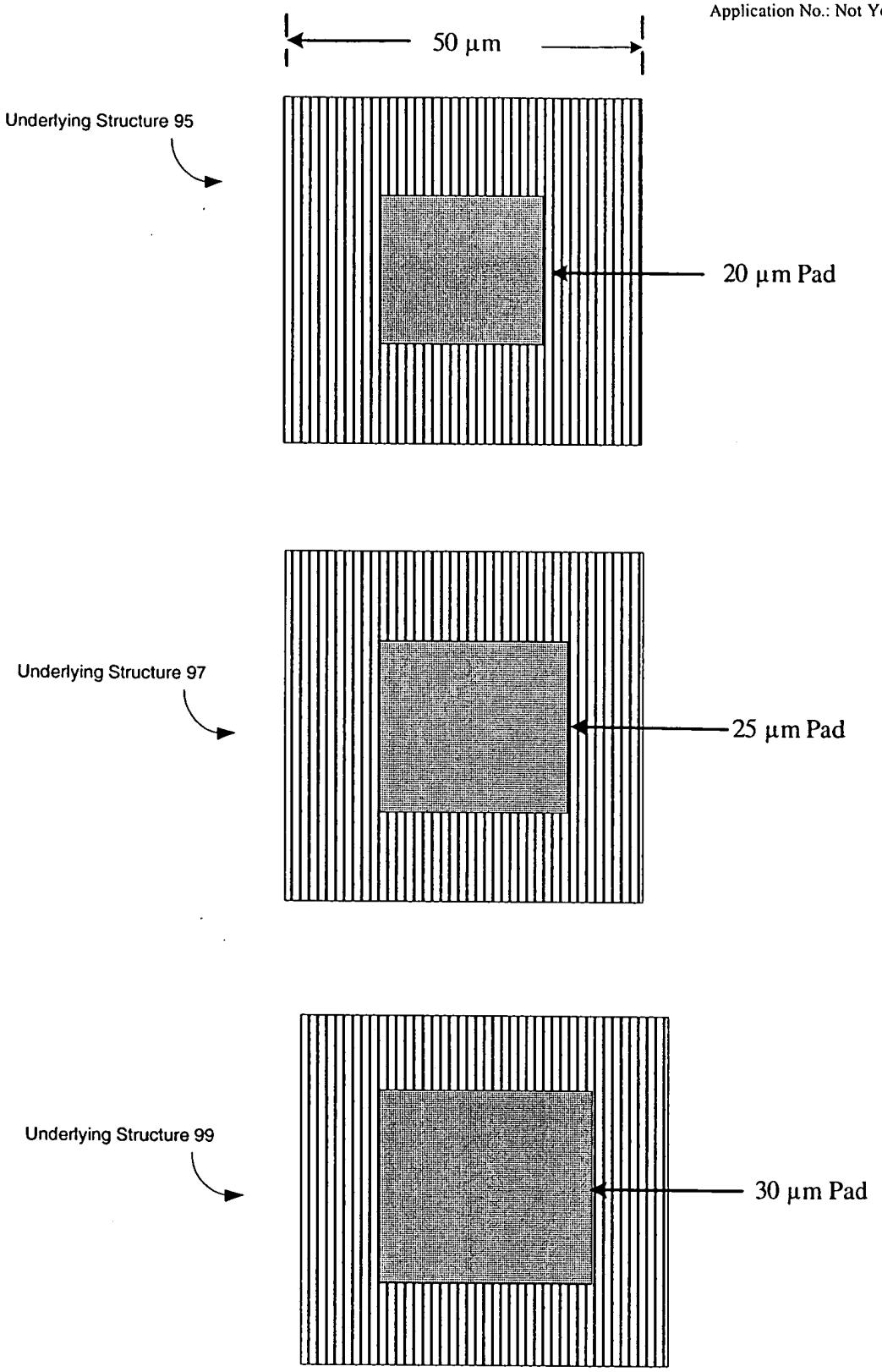
50 µm
Underlying Structure 95
20 µm Pad
Underlying Structure 97
25 µm Pad
Underlying Structure 99
30 µm Pad

FIGURE 5

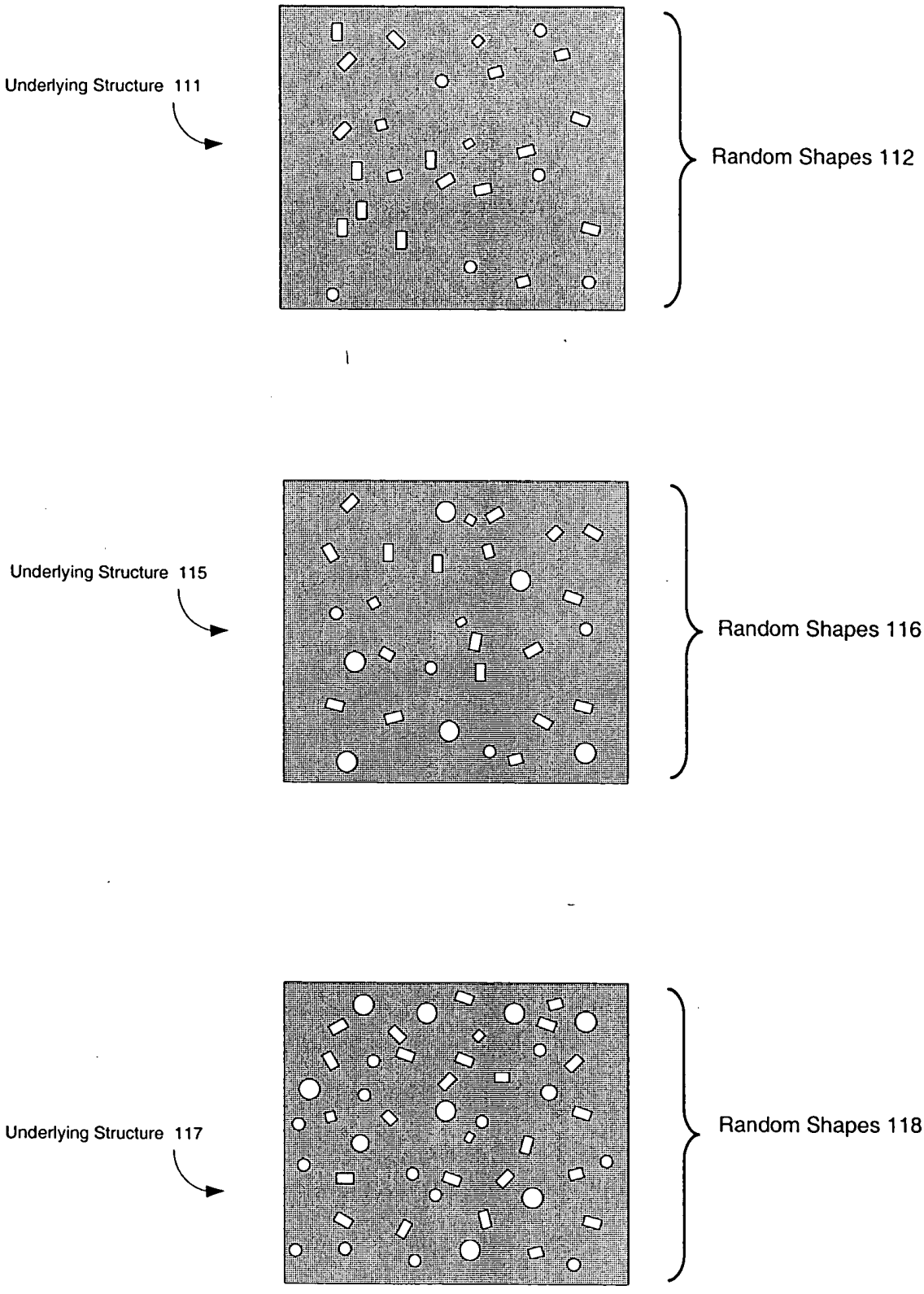
Underlying Structure 111
Random Shapes 112
Underlying Structure 115
Random Shapes 116
Underlying Structure 117
Random Shapes 118

FIGURE 6

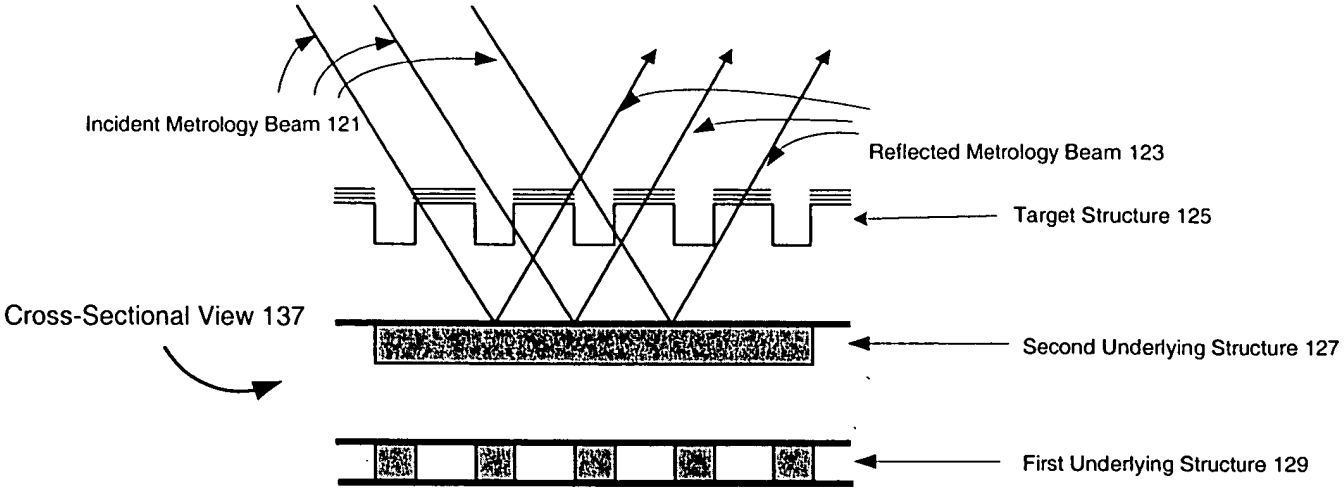

FIGURE 7A

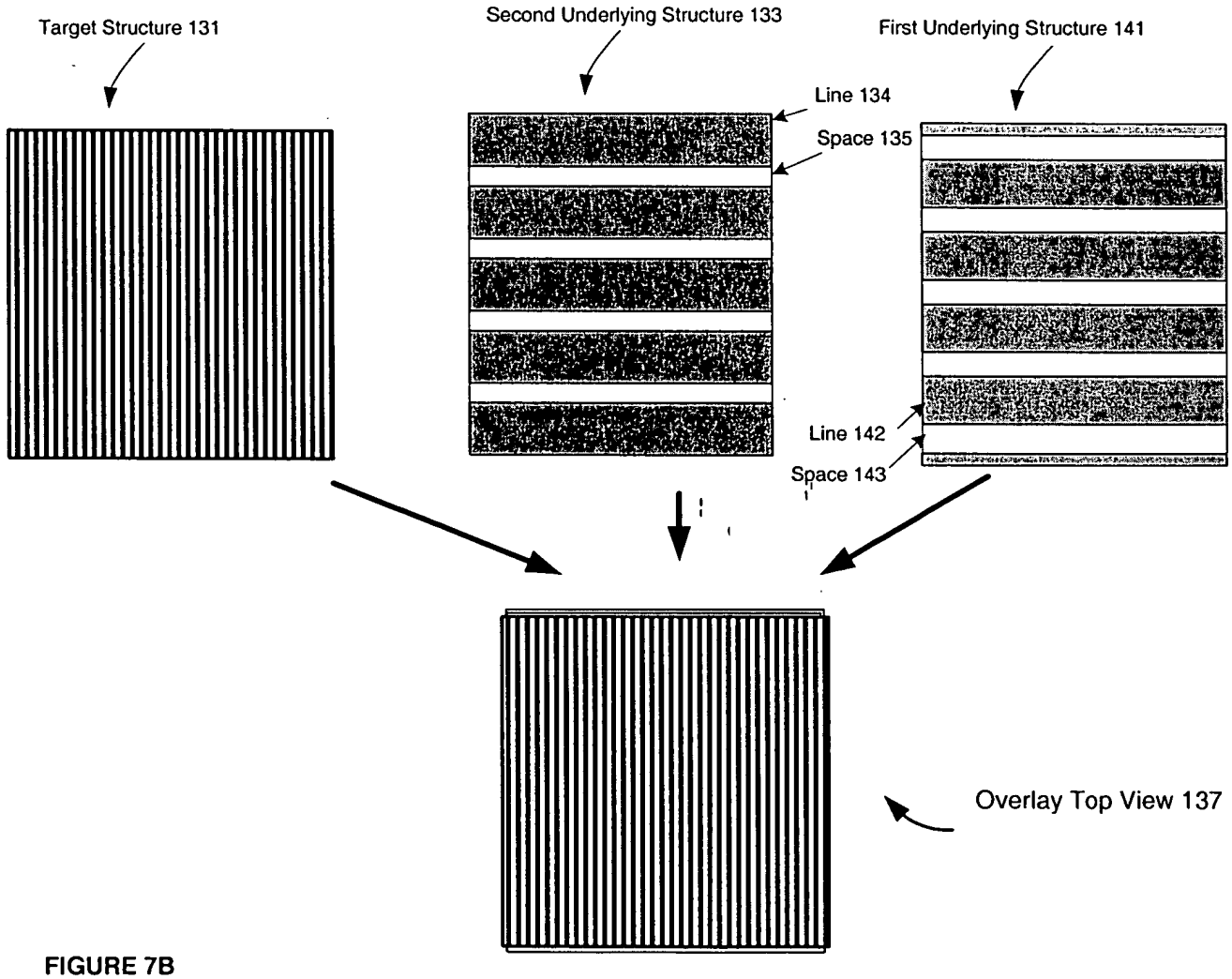

FIGURE 7B

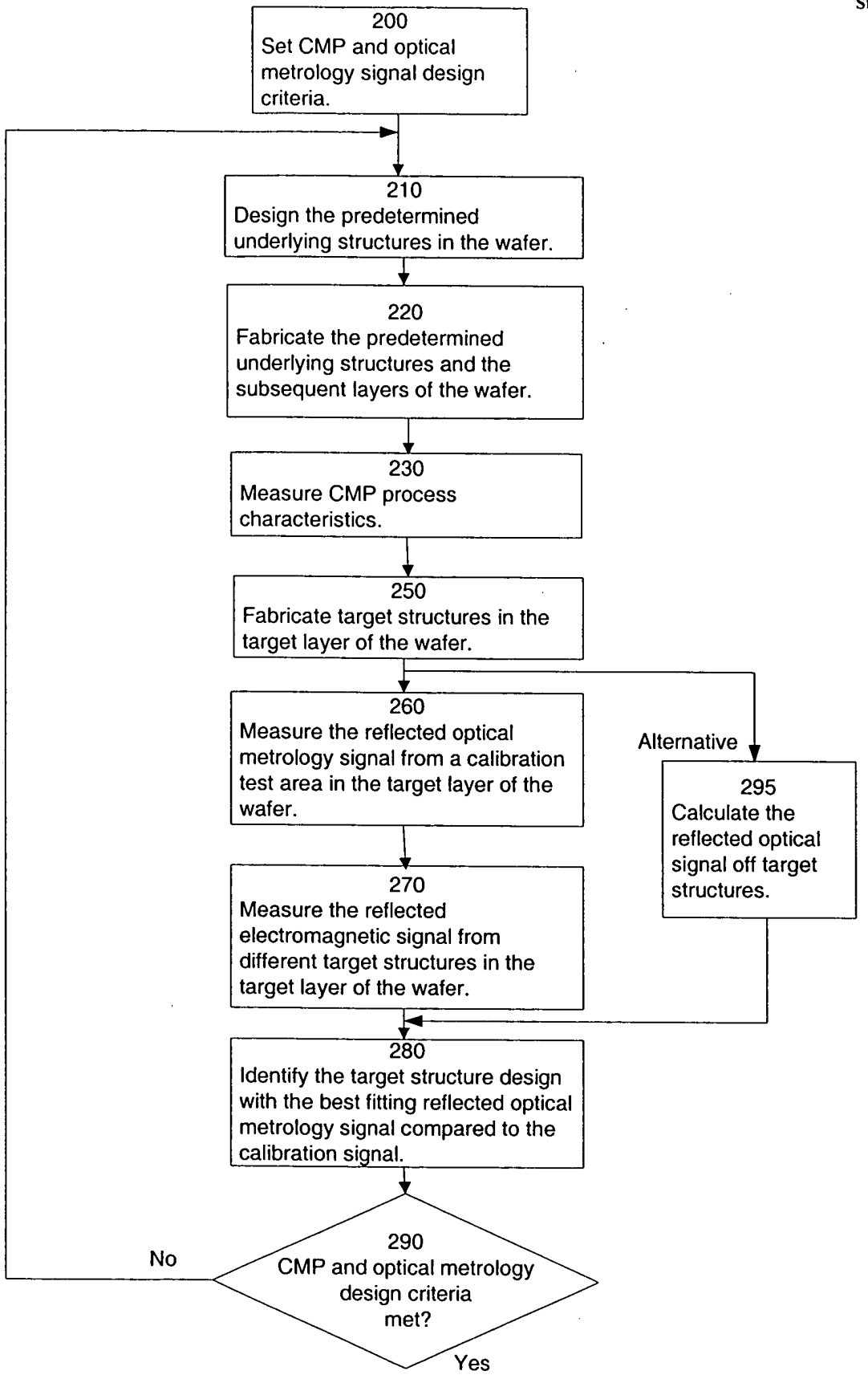
200
Set CMP and optical metrology signal design criteria.
210
Design the predetermined underlying structures in the wafer.
220
Fabricate the predetermined underlying structures and the subsequent layers of the wafer.
230
Measure CMP process characteristics.
250
Fabricate target structures in the target layer of the wafer.
260
Measure the reflected optical metrology signal from a calibration test area in the target layer of the wafer.
270
Measure the reflected electromagnetic signal from different target structures in the target layer of the wafer.
Alternative
295
Calculate the reflected optical signal off target structures.
280
Identify the target structure design with the best fitting reflected optical metrology signal compared to the calibration signal.
290
CMP and optical metrology design criteria met?
No
Yes

FIGURE 8

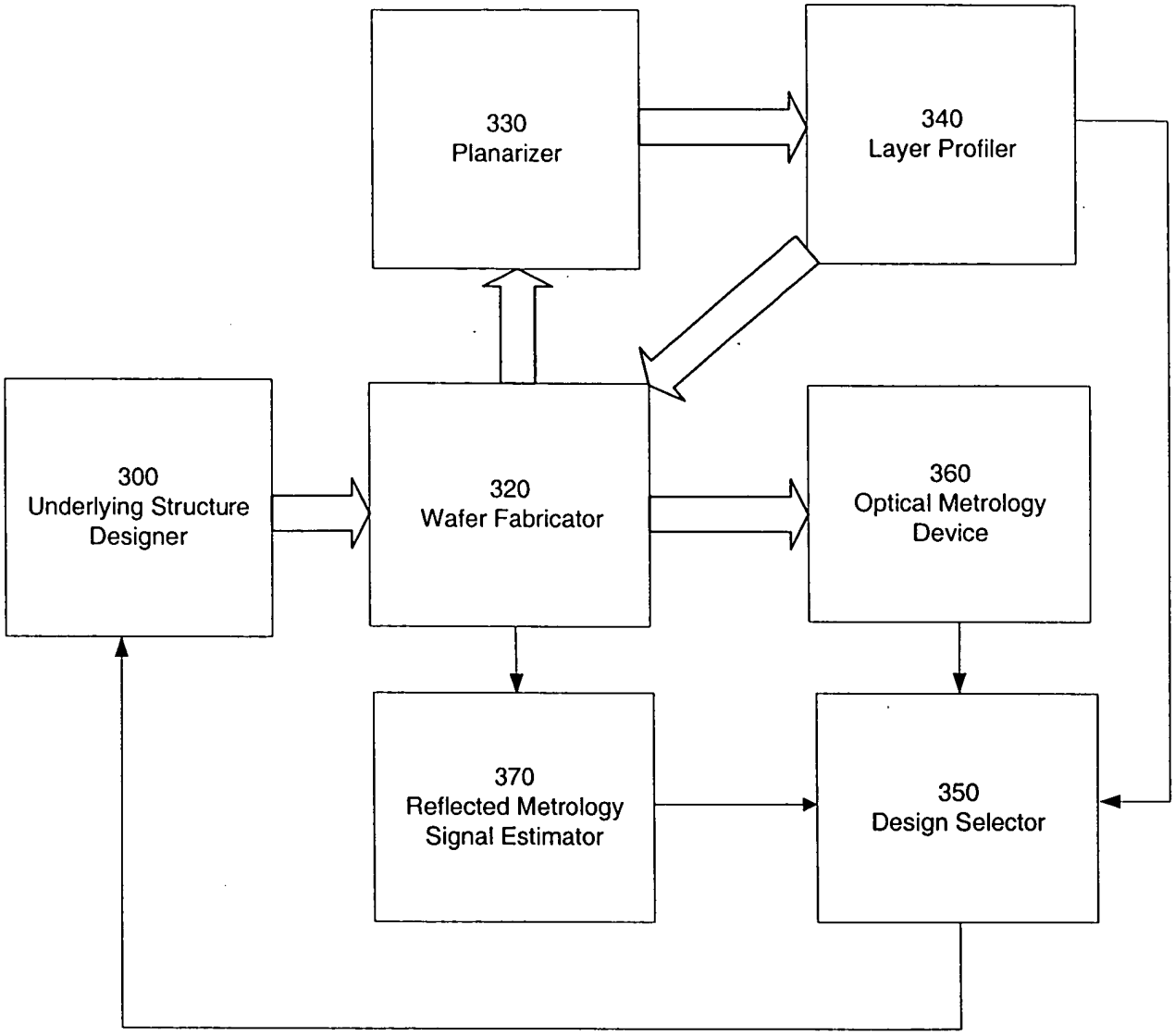
330
Planarizer
340
Layer Profiler
300
Underlying Structure
Designer
320
Wafer Fabricator
360
Optical Metrology
Device
370
Reflected Metrology
Signal Estimator
350
Design Selector

FIGURE 9

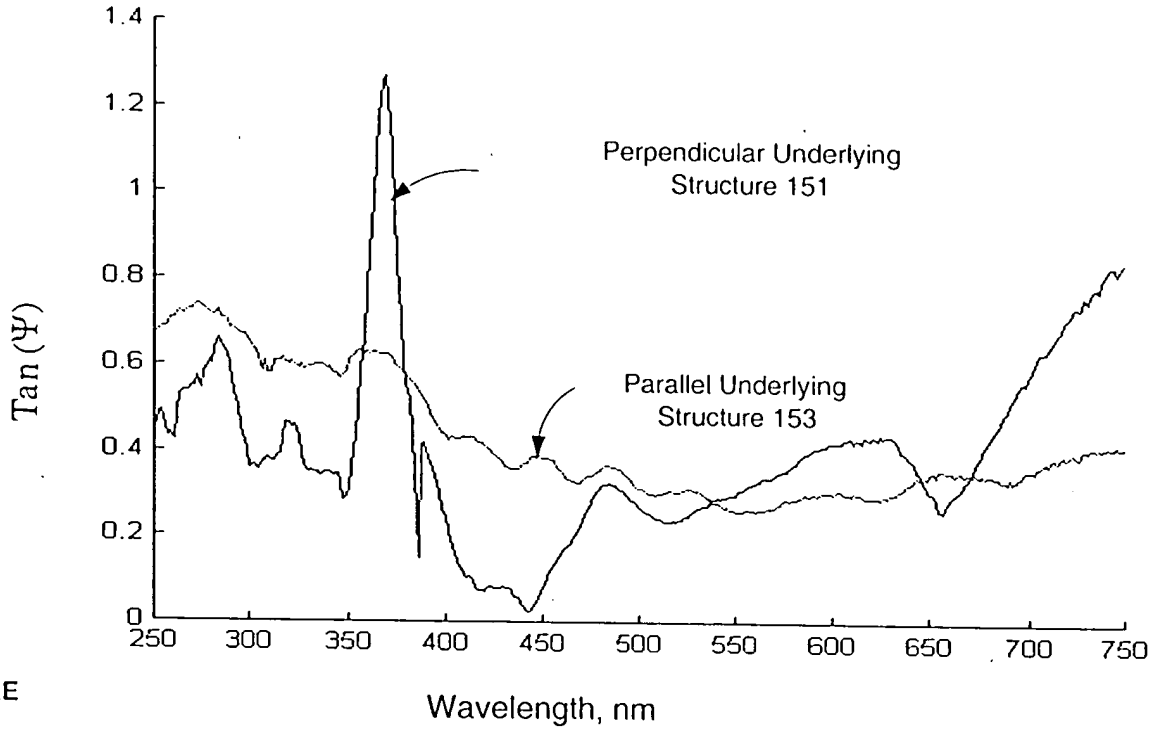

FIGURE
10A

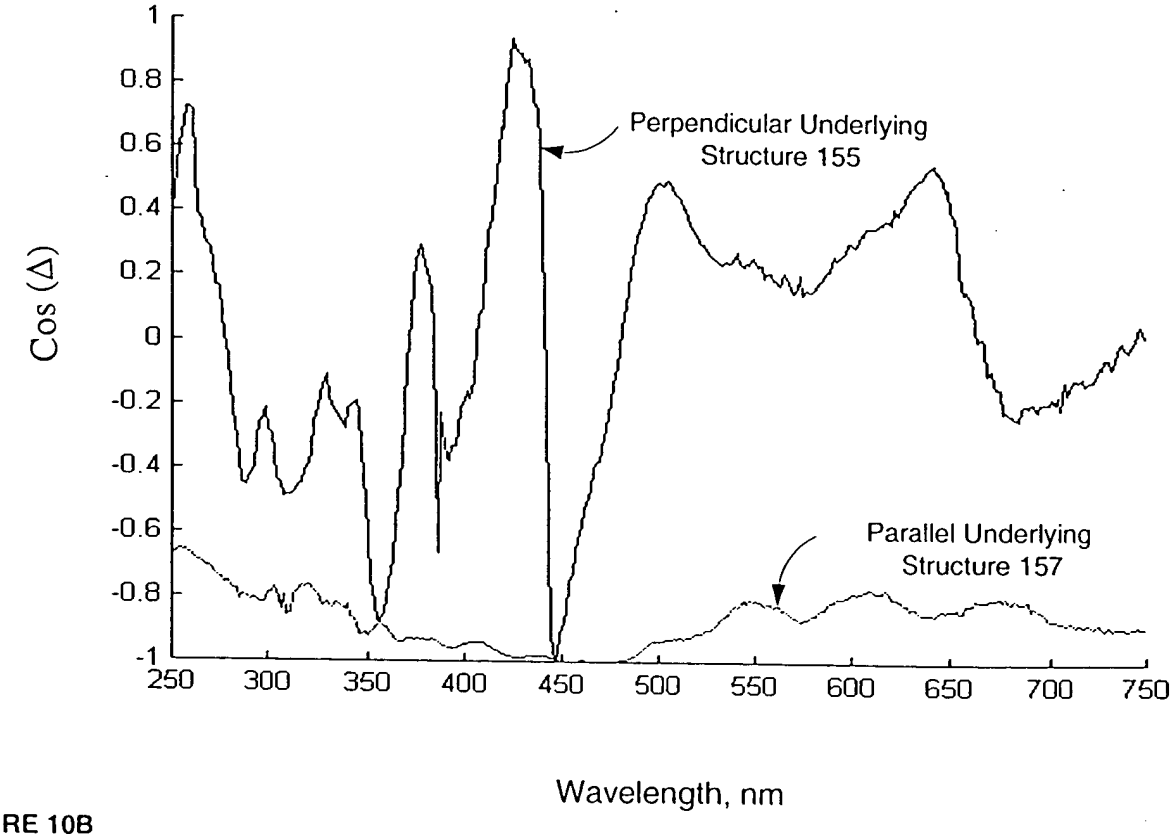

FIGURE 10B